Space Weather Forecast

Issued on Thursday, 08 December 2022 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares throughout. Chance of G1/Minor Storms Day 1.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with occasional to frequent low level Common-class flares observed. There are eight sunspot regions on the Earth-facing side of the Sun, with the disc dominated by a large region in the south centre disk which, despite its size, remains relatively stable. Two other regions in the northeast have shown some minor growth and change in complexity. The remaining spots on the disk have shown little growth and remained relatively stable.

There is no evidence of any Earth-bound Coronal Mass Ejections (CMEs) in available satellite imagery.

Solar Wind / Geomagnetic Activity: Solar winds, as observed at L1 by DSCOVR, were initially at Slow-Ambient levels around 320 km/s, but increased through the day due to the approach and arrival of coronal hole fast winds, and are currently around 460-480 km/s. The total interplanetary magnetic field was Weak initially, before becoming Moderate from 07/0900 UTC and Strong 07/1420-1830 UTC. The important north-south component was initially mostly negative, but has been largely positive since around 07/1600 UTC.

Geomagnetic activity was initially Quiet (Kp 0-2) before becoming Unsettled to Active (Kp 3-4), with two G1/Minor Storm (Kp 5) intervals observed during the UTC afternoon.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to remain at Low levels, with occasional Common-class flares and a Chance of isolated Moderate flares. Although one region may emerge across the eastern limb on Day 1, no significant regions are expected to arrive or depart in the next four days.

Solar Wind / Geomagnetic Activity: No Earth-directed coronal mass ejections have been observed on available imagery. Solar wind speeds are currently Slightly-Elevated due to the influence of fast wind from a coronal hole. This enhancement will likely continue through Days 1 and 2 (8-9 Dec), likely becoming Elevated at times. Winds expected to gradually ease by the end of the period as the influence from the coronal hole wanes.

Geomagnetic activity is expected to be initially Unsettled, with Active intervals Likely and a Chance of further G1/Minor Storms on Day 1 due to the arrival of fast winds from a coronal hole. Geomagnetic activity is expected to return to Quiet by Day 2 (9 Dec), with a diminishing Chance of Unsettled intervals.

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Energetic Particles / Solar Radiation: No solar radiation storms are expected, particularly given the observed lack of X-ray flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	10	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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